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GENERAL SCIENCES



# ALBERTA FORESTS

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GOVERNMENT OF THE  
PROVINCE OF ALBERTA

Department of Lands and Forests

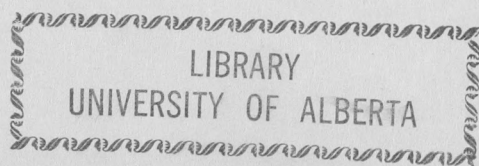
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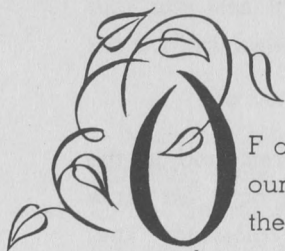








## Foreword



F all our natural resources, other than land and water, our forests are the most valuable to the human race; they not only supply the lumber for our homes, buildings and a great variety of other construction, but they are the source of supply for our pulp and paper; they are the home of many of our birds, big game and other wild life; they provide park and playground, and last but not least, they protect the watersheds from which most of our water supply originates.

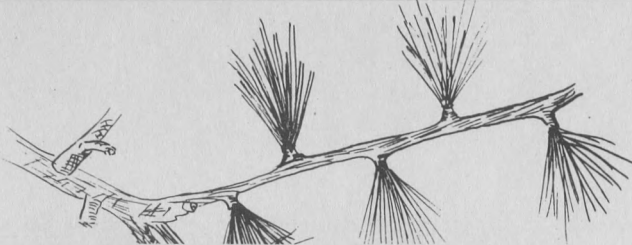
This booklet deals with this valuable resource and has been prepared in an endeavour to meet the many requests and general need for authentic information regarding the extent and importance of forests and forest administration in the Province of Alberta.

It is the responsibility of the Government and the people of the Province to work unitedly together with industry in an endeavour to conserve and preserve our forests. The Government appeals to all citizens to take their full responsibility in trying to prevent forest fires and in keeping our forests green, thereby maintaining a supply of timber, a home for our big game and other wild life and a playground, as well as assuring our water supply.

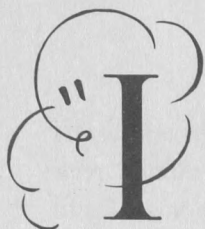
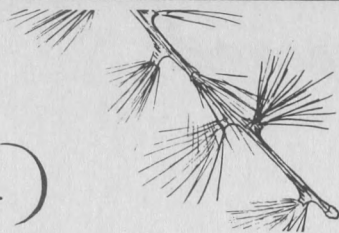
Without our forests Alberta would be a desert.

N. E. TANNER,

Minister of Lands and Forests.



## Introduction



like trees because they seem more resigned to the way they have to live than other things do." So wrote Willa Cather in "*Death Comes for the Archbishop*", and it should suggest to all of us a reason why the trees need and deserve our special care. Nor is there lack of more material considerations if the gossamer thread of sentiment be too fragile to bear the weight of "practical" argument. Some will be presented in these pages as we go along, but there are others which may as well be touched upon here, at the outset.

Said the Monthly Letter of the Royal Bank of Canada for February, 1949:

Everyone knows that this industry (forestry) is Canada's most powerful collector of United States dollars through export of products. In 1947 the industry took pulpwood valued at \$203 millions and converted it into products having a gross value of \$706 millions, thus increasing the value of the wood it used by  $3\frac{1}{2}$  times . . . There are, of course, many other manufacturers which include wood as their chief raw material, and it would surprise any of us to follow a tree from the forest to its final product and to see the work that is supplied in its harvest and fabrication. The forest provides employment regularly for many people.

Few realize sufficiently the value of a tree in the vast field of agriculture. The average farmer is prone to value his trees principally as material for fence posts; the pioneer mind, necessarily



much occupied with today's immediate needs, is not easily impressed by the thought that a spruce forest — the stuff that lumber, pulp and paper are made of — requires 60 to 100 years to attain maturity.

Yet scientists have found that the removal of timber is one of the chief causes of soil erosion, and they add, for our guidance, that not less than twenty per cent of any farmland should be supporting trees.

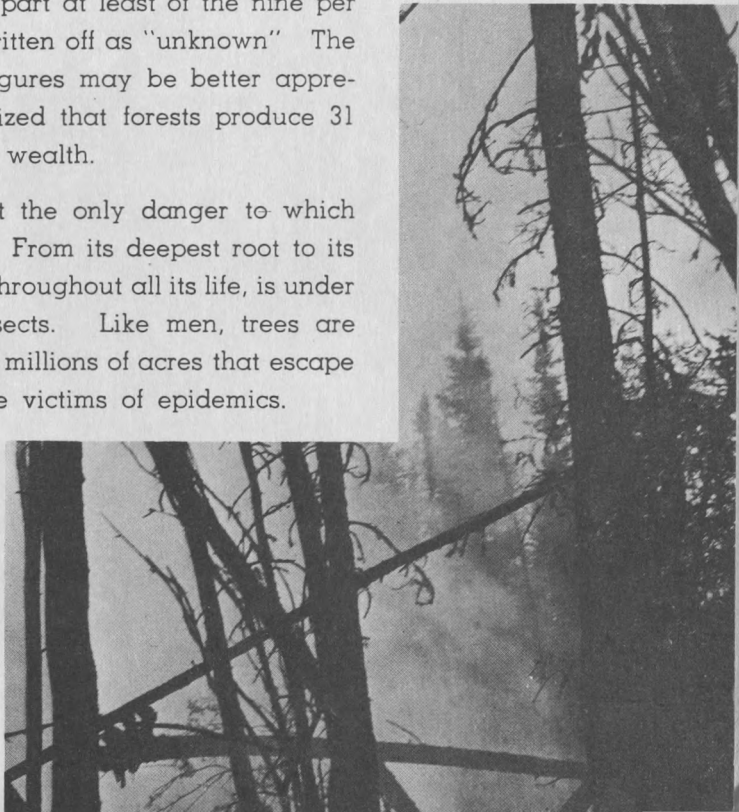
The very earliest history of man was woven around wood — wood for his weapons, his bows, his arrow shafts, his clubs and battering rams, his ships, swift chariots and lumbering carts, timber for his buildings. But only now are we beginning to realize that the value of a tree is something more than the price it would fetch in the market place.

Yet over a ten-year period, Canada's average annual loss from forest fires was substantially more than four million dollars and of this 50 per cent was the result of human carelessness. What is even more shocking, if such is possible, is that an additional six per cent was of deliberate, incendiary origin. To this, no doubt, could be added some part at least of the nine per cent whose cause is written off as "unknown" The seriousness of these figures may be better appreciated when it is realized that forests produce 31 percent of Canadian wealth.

But fire is not the only danger to which the forest is exposed. From its deepest root to its topmost twig the tree, throughout all its life, is under constant attack by insects. Like men, trees are subject to disease, and millions of acres that escape fire and insect become victims of epidemics.

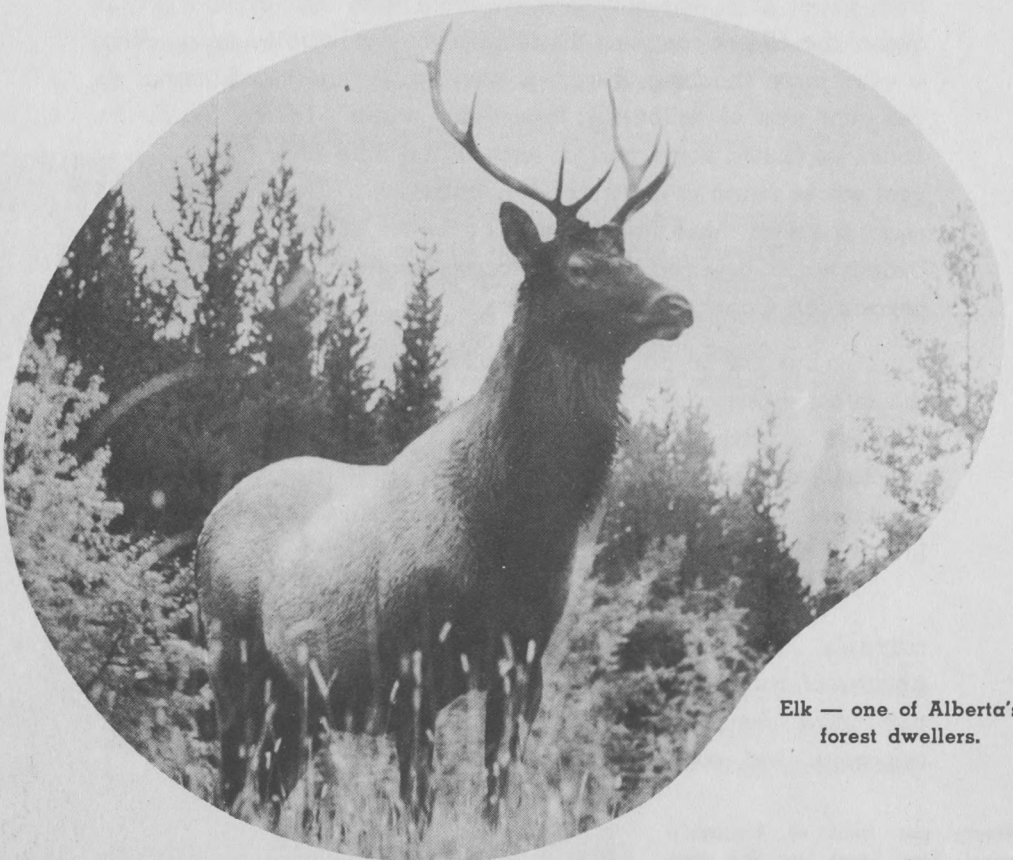
Reasons for carefully designed policies of conservation now become apparent, but con-

**Ninety per cent of Canada's forest fires, such as the one shown here, are due to carelessness.**



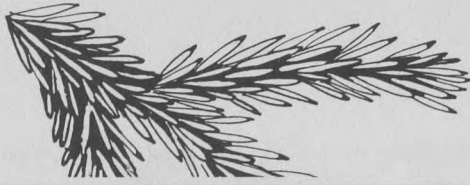
servation is not something which governments can carry out single handed; governments are helpless without the co-operation of the people who, after all, are most vitally concerned. The Royal Bank letter previously quoted says also: "It is worthwhile for the man who owns trees to take care of them and provide for a future yield, because the market for wood is expanding." And: "As a result of careful management there are forests which have been cut over from time to time for a hundred years and are still giving fine yields of wood."

The Forestry Division of the Alberta Department of Lands and Forests is equipped for the protection of forests from fire, from pestilence and from disease and for their suppression when any of these appear. But here, as elsewhere in life, prevention is better than any amount of suppression, and here is where people themselves can help as will be shown, amongst other things, in the pages which follow.



Elk — one of Alberta's  
forest dwellers.





## Historical



W

E are told that in prehistoric times, before the first appearance of man upon the earth, practically the whole planet not covered with water was thick with trees. It was only as the human family grew and demanded wood for their dwellings, their fuel, their weapons, that these forests began to disappear; in due time vast areas became denuded and, due to climatic changes, never regained their covering. It took many centuries to impress man with the importance of trees and the need for a scientific approach to their culture and conservation. Notwithstanding, it is still less than a century since forestry attained the status of a science. Its birthplace was central,

A bulldozer punches its way through the snow-covered access trail of an Alberta forest.



northern and western Europe and there the most advanced forestry practice in the world is to be found to this day.

It may be said that practically all countries took up the science of forestry only after it was forced upon them by shortage. Only Russia, in the middle of the 19th century, initiated an advanced forest programme years before necessity compelled her to do so.

In Sweden lumbering has been going on for hundreds of years — one lumber company has been logging since 1200 A.D. —but there was no milling until 1860. At about that time also forestry became a science.



In Canada the Dominion Forest Service was started in 1898 as a branch of the Department of the Interior. Before this there had been some forestry organization in eastern provinces but little had really been accomplished. Except for a short but concentrated campaign of public education, the Dominion Forest Service's first step was the setting up of tree nurseries at Brandon, Manitoba, and Indian Head, Saskatchewan. The former was closed in 1904 and the work concentrated at Indian Head. Some fire rangers also were appointed in the Northwest Territories. At that time the Dominion's control of the forests was limited to what is now Manitoba, Saskatchewan and Alberta, and a strip of land along the main line of the Canadian Pacific Railway in British Columbia.

The year 1906 was important in the history of Canadian forestry, for in that year Parliament passed an Act respecting Forest Reserves whose purposes were cited as (1) the reserving of





Hundreds of thousands of square miles all over the earth's surface, now arid desert, were once arable farmfields before modern science was able to intervene to prevent erosion. Such would be the fate of our western prairies without the protection of Alberta's forests.

timber supplies, (2) the reserving of areas unsuited to agriculture so that they would not be homesteaded and (3) the preserving of the water level in streams by conserving the timber on the upper watersheds.

The same year was notable also for commencement of the first forest reserve in Alberta — what is now part of Elk Island Park — and for the Canadian Forestry Association's convention in Ottawa over which the prime minister, Sir Wilfrid Laurier, presided.

In 1908 the Dominion government brought about an important change of policy regarding the sale of timber berths. It had been the practice to sell large Western tracts without any examination or cruise being made, which often resulted in the purchase of whole watersheds regardless of the amount of timber. Under the new policy the area applied for had to be surveyed

and cruised before being offered for sale. Auction of timber was started also at this time.

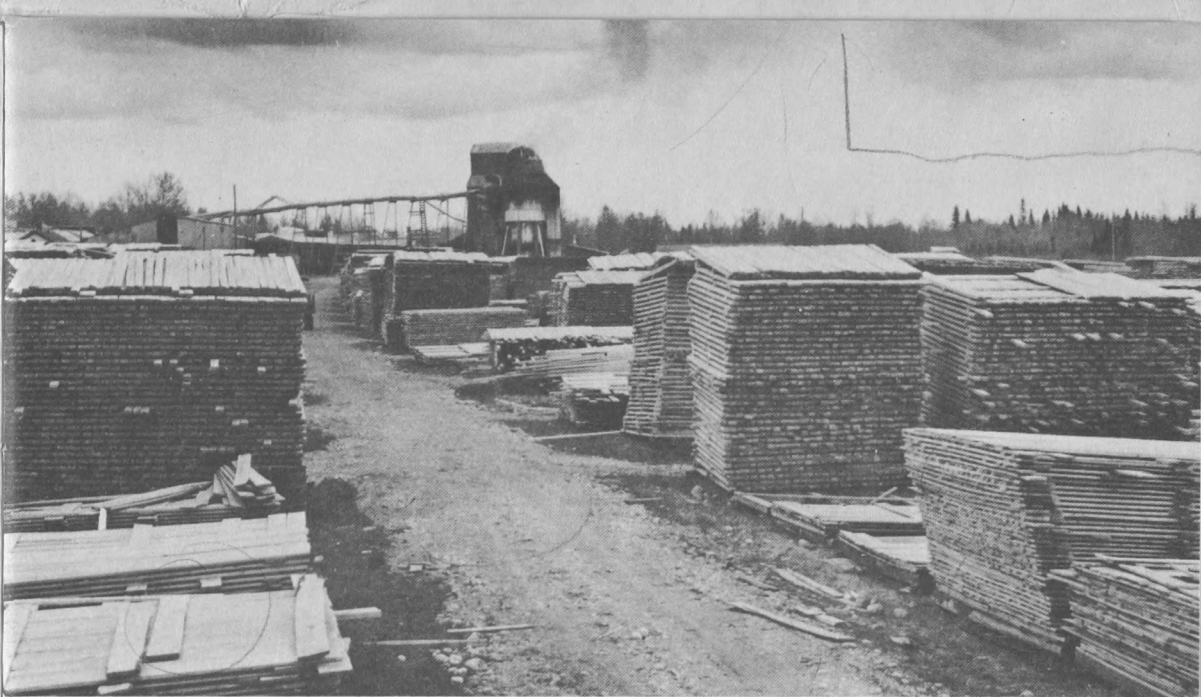
By 1908 eight forest reserves had been established; four in Manitoba, three in Saskatchewan and one in Alberta. There was also a reservation of land in the Cypress Hills in south-eastern Alberta and south-western Saskatchewan.

In 1910 a survey was made to determine the eastern boundary of the Rocky Mountain Forest Reserve. The survey extended from the United States border to the North Saskatchewan River. The following year Mr. W. N. Millar was appointed to organize the administration of the reserve and fire patrols were set up on the east slope of the Rockies and along the mountain stretches of the railways. On May 19 of that year, too, The Forest Reserve and Parks Act was passed by Parliament. This set aside 11,656,320 acres of reserves and parks in the Rocky Mountains. The Dominion Forest Service set up three inspection districts in Manitoba, Saskatchewan, Alberta and the British Columbia railway belt. The Rocky Mountains Forest Reserve was divided into five divisions or forests—Crowsnest, Bow River, Clearwater, Brazeau and Athabasca. A forest supervisor was placed in charge of each division and ranger districts were set up on each reserve.

Winter scene in an Alberta lumber camp.







A typical lumberyard.

In 1912, for the first time, statistics were gathered to show the value of forest products produced in the Dominion. They were as follows:

Timber, lath and shingles .....	\$ 84,000,000
Firewood .....	50,000,000
Pulpwood .....	12,000,000
Posts and rails .....	10,000,000
Railway ties .....	8,000,000
	<hr/>
	\$164,000,000

The Lesser Slave Reserve was established in 1913, comprising 5,023 <sup>sq. miles.</sup> acres. In the same year grazing was allowed on the reserves, mostly on the Crowsnest and Bow River, and two hundred permits were issued representing from 15,000 to 20,000 head of stock.

From then until 1918 work of organizing the Alberta Forest reserves included the construction of 2,000 miles of roads and trails, 350 miles of telephone line, buildings for 20 ranger stations and 50 smaller cabins. In 1920 aircraft were used for the first time for fire patrol and detection and a temporary aerodrome was set up at Morley. This aerodrome was discontinued in 1921 and a larger one established at High River. At the

same time a wireless station was set up and small sending sets were placed in patrol planes. This was less than completely successful, but on many occasions valuable time was thus saved.

The next important change came in 1930 when natural resources were taken over by the province and the reserves became the responsibility of the provincial government. The set-up remained about the same, but scientific and technical research was left for the Dominion government.

The area coming under the new provincial organization comprised 162,235 square miles — 14,410 square miles in the reserves and 147,825 square miles in the Edmonton Fire Ranging District. The first year of provincial control was marked by a bad fire season with large expenditures for suppression.

In 1932 the need for economy compelled the cutting down of the staff set up by the provincial government. The Lesser Slave Lake Reserve was done away with and the area placed under the Northern Alberta Forest District. The Crowsnest and Bow

River and the Brazeau and Athabasca reserves were combined. This did away with three reserve offices and reduced the number of supervisors from the original seven under the Dominion service to three under the new provincial service.

Absorption of some of this personnel was made possible by the Forest Services taking over administration of the timber branch.

The tree nursery at Oliver dates back to 1931 when it was established as an "activity" of the mental hospital there. The following year 8,095 pine and spruce seedlings and 700,000 caragana seedlings were sent out to farmers all over the province,



consummating a policy of augmenting the Dominion government's tree distribution plan.

Small nurseries were established in 1933 at the Ponoka mental hospital and the Fort Saskatchewan and Lethbridge jails to relieve the pressure on the staff at the Oliver institution. Now the last named has become a forest station in its own right and independent of the hospital.

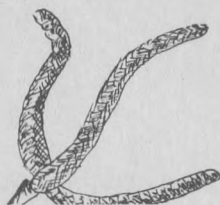
From 1933 to 1948 the forestry branch continued in very much the same way as at that time, but it is increasingly apparent that even in a good fire year the limited staff is having a good deal of difficulty in keeping up with the amount of improvement work in the forests, and at the same time properly supervising timber cutting, grazing, campers, fire patrol and duties connected with their positions as honorary fish and game wardens.

This work must be carried on to protect our watersheds and conserve available timber for the use of the people.

**A truckload of finished lumber.**







# The Business of Forestry

THE biggest business in Alberta, as in any community from a hamlet to an empire, is government. And just as any big business is divided into departments — production, technical, sales and so forth — so the business of government is organized.

In a province so wealthy in natural resources as Alberta it follows that their administration is an important responsibility. Until 1930 these resources were administered by the Dominion government, and forests in particular by the Dominion Forest Service. In that year the whole of the



natural resources were surrendered by the Dominion to the province, the latter assuming entire responsibility including forests. This was discharged until 1949 by the Minister of Lands and Mines, but by that year natural resources had become so large an item in the public economy that it was found necessary to reorganize the Department into two new departments respectively of Lands and Forests and of Mines and Minerals. It is to the former of these that the care and administration of our 130,620 square miles of forests is assigned — fourth largest forest area amongst the provinces of Canada.

The work of the former Dominion Forestry Services was naturally taken up by the Department of Lands and Mines and in due course by the present Department of Lands and Forests.

The magnitude of the responsibilities borne by the Director of Forests may be imagined. Under him forest administration is carried out by a staff of forest superintendents, timber inspectors, forest rangers and others.

For purposes of administration the forests are divided into five districts: The Crowsnest, Bow River, Clearwater and Brazeau-Athabasca Forest Reserves and the remainder of the forest lands in Alberta known as the Northern Alberta Forest District—the last named subdivided into ten divisions. Each of these areas is further divided into ranger districts.

The Cypress Hills Forest Reserve was established in the extreme southeast corner of the province for the protection of a small watershed there and, being



The eyes and ears of the Alberta Forest Reserve. A look-out tower from where the first wisp of smoke is spotted which tells of a forest fire.



small and not heavily timbered required the supervision of only one headquarters ranger and an assistant.

Administration of forests and divisions is supervised from central headquarters by forest superintendents and timber inspectors or chief rangers, respectively. Back of these are assistant superintendents of forests, assistant timber inspectors and rangers.

Each forest or division maintains fire lookout towers equipped with two-way radio or telephone lines linked to headquarters. The lookouts are manned during the fire season by towermen responsible to the supervising chief ranger.

Management of the four main reserves requires a senior superintendent, four superintendents, four assistant superintendents, four headquarters rangers, 29 rangers, 34 assistant rangers and 15 towermen. Northern Alberta Forest District personnel consists of 2 timber inspectors and 9 chief forest rangers, 9 assistant timber inspectors, 41 rangers, 9 assistant rangers and 13 towermen.

Forest rangers, whose duties are many and varied, live at ranger stations or cabins situated in the various districts of the Forest Reserves except in the Northern Alberta Forest District where they live at their own homes. These stations serve as ranger headquarters. Other cabins are located strategically in each district for use when on patrol or as temporary headquarters in case of an outbreak of fire or other emergency. Each district is well organized in the matter of tool caches and key men designated to take charge of suppression crews in times of outbreaks of fire.

Under the supervision of the forest superintendent or chief ranger the forest ranger interprets for the public the Acts and Regulations administered by the Forest Division for the conservation of natural resources. Successful application of these Acts and Regulations depends mainly on the degree of cordial relations achieved by the ranger with the public. He is concerned with





the protection of the forests and timber lands from illegal timber cutters, fire and insects. But besides this the preservation of game, fish and the feathered population of the forest calls for his constant attention.

His chief interest, however, is centred in the prevention and spread of fire. In spite of fire warning posters, radio and press campaigns and personal appeals to the public, carelessness with fire is still the main cause of the destruction of thousands of acres of forest lands each year.

Facilities of the Forest Division are naturally in a state of constant expansion, keeping pace with the growth of the organization and its requirements. At the time of this writing the following establishments and equipment are maintained:

	Forest Reserves.	N.A.F.D.
Ranger Stations .....	24	1
Ranger Cabins .....	72	60
Lookout Towers .....	15	13
Telephone lines, miles .....	935	130
Forest access roads, miles ...	701	---
Forest access trails, miles ...	3,218	700
Radio stations, two-way ....	4	17
Radio, portable sets .....	33	68
Mobile car units .....	1	12

Extra assistance to the permanent staff during periods of high fire hazard is provided by the appointment of special patrolmen and fire suppression crews.

A stock-taking of our forest resources, both merchantable and immature, is the first requirement of good management. The location, conditions of growth and depletion should be ascertained as a guide to their rational utilization. This is now being carried out on the forest areas under jurisdiction of the Eastern Rockies Forest Conservation Board by the Federal Department of Resources and Development. Those forest areas directly under the jurisdiction of the Provincial Government are being inventoried under contract with an aerial survey company which has undertaken to complete the work by March, 1953. In both cases most of the information is obtained from vertical aerial photographs supplemented by some ground checks. Maps and volumetric data will thus soon be available showing the location and quantity of merchantable timber, as

well as the extent and age of the younger timber which represents the sawlogs of the future.



When this information has been analysed, forceful and comprehensive action may be taken to build up and maintain the forest resources so as to insure their maximum contribution to the prosperity of the province.

In the field of research valuable assistance has been rendered by the Dominion Department of Agriculture through its prairie regional laboratories. The Alberta Government's Forest Division as yet maintains no research branch of its own, but pathological conditions are referred to the Dominion Laboratory of Forest Pathology, University of Saskatchewan, Saskatoon, and problems of entomology to the Dominion Entomological Laboratory at Calgary.

That systematic forest management such as has been here described pays dividends can be amply demonstrated. Consider the case of the Forest Reserves where the annual fire loss remains at a low level compared with timber damage sustained by the Northern Alberta Forest District. Settlement in the reserve forests is restricted and travel carefully controlled with the result that fires caused by human agencies are rare. The inference to be taken from this experience is that more forests should be established to provide the protection for our timber stands necessary for their self-perpetuation.

Perhaps the most important development of recent years has been the formation of the Eastern Rockies Forest Conservation



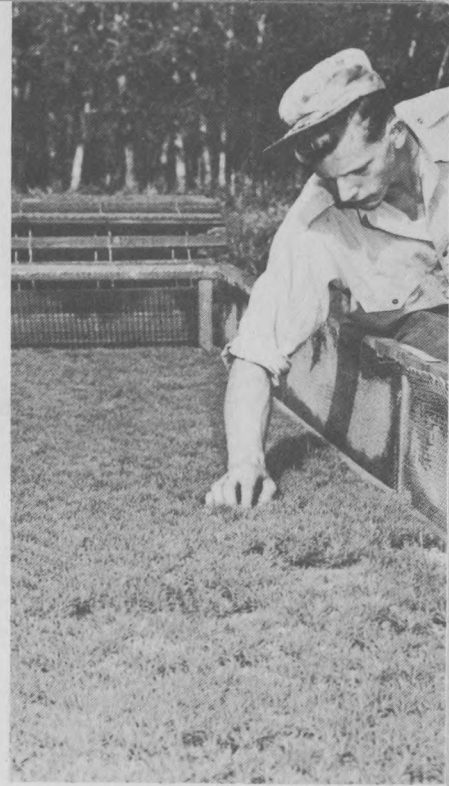
"A brotherhood of venerable trees." Seedlings, carefully tended at this stage in the nursery at Oliver, when they grow up will be brothers together in some forest.

Board. The area known as the East Slope stretches from the International Border north along the foothills region to the north boundary of Township 46 and includes timber land already incorporated in the Clearwater, Bow River and Crowsnest reserves. It is in this area that the Board under the chairmanship of Major-General Howard Kennedy is implementing the Alberta Government's already established policy of planned forest economy intended to keep the timber lands under control on a self-sustaining basis. It is expected that the influence of this programme will extend to forest areas beyond the jurisdiction of the Conservation Board.

Similar treatment is provided for public forest lands not included within reserves. It provides measures for insuring the renewal of forests and for management designed to permit the growing and harvesting of perpetual successive crops of forest products.

It is the Alberta Government's policy not to sell timberland outright but rather to sell, by tender to the highest bidder, rights to cut timber on designated berths. The government derives its revenue for the public benefit from royalties, timber areas tax, fire-guarding charges, ground rent and such.

The Forest Division's expansion in growth and importance is reflected in, amongst other things, the strengthened force of foresters and forest engineers. Forestry precepts and practices long ago proposed are being accepted and it is expected that their adoption and implementation will result in the self-perpetuation of Alberta's forests.



The infant seedling is beginning to grow up. Here, a two-year-old, he is taken from his bed and transplanted into his mother earth.





# Products of Alberta Forests

## Veneer

PACKAGE PLYWOOD  
CONSTRUCTION PLYWOOD  
AIRCRAFT PLYWOOD  
COMPREGNATED PLYWOOD  
MISCELLANEOUS PLYWOOD  
FANCY VENEERS

## Wood Chemistry

BOLTS, LIMBS, EDGINGS OR STUMPS  
HARDWOOD DISTILLATION  
SOFTWOOD DISTILLATION & EXTRACTION  
EXTRACTIVES

## Sawdust

WOOD FLOUR  
WOOD HYDROLYSIS  
FUSION  
PLASTIC MOULDING POWDER & SHEETS  
OXALIC ACID

SULPHATE PROCESS  
SODIA PROCESS  
WOOD PULP  
DISSOLVED CELLULOSE PRODUCTS  
BY-PRODUCTS

PAPER MANUFACTURE  
PAPER CONVERSION

## Miscellaneous

POLES AND POSTS  
RUSTIC STRUCTURES  
TIMBERS  
PILINGS  
SPLIT PRODUCTS  
FUEL WOOD  
MILL SHAVINGS  
BARK  
SAP & GUM PRODUCTS  
BOLTS  
SAWDUST  
EDIBLE FRUITS

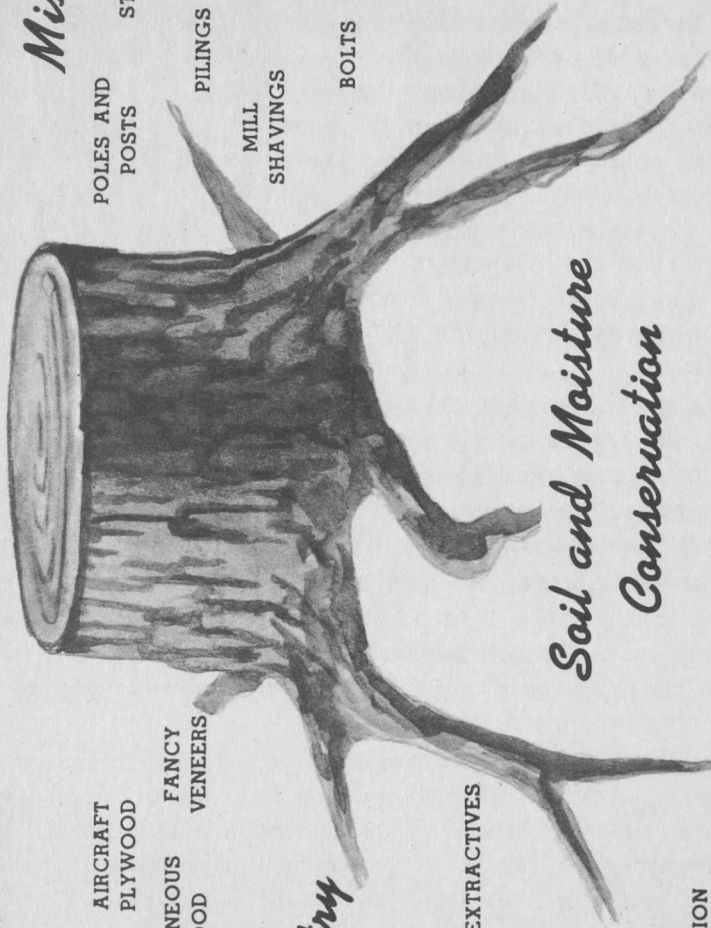
## Sail and Moisture Conservation

## Saw Logs

CONSTRUCTION LUMBER  
FOR ALL TYPES OF BUILDINGS

## Industrial Lumber

MANUFACTURED PRODUCTS  
FURNITURE  
VEHICLES  
MACHINERY & EQUIPMENT  
CONTAINERS



Although not all of the processes are carried on within the province, Alberta lumber eventually finds its way into the above products of modern industry.

These products are but a few well-known samples of the thousands created from the forest harvest.

There can be a continuous supply of these necessities because trees, unlike other natural resources, are renewable. Nature has a great urge to replace forest growth and, after mature trees have been cut, seedlings spring up everywhere.

Nature, in her job of providing new wood for future forest products, is assisted by modern scientific forest management as advocated and practiced by the forest industries and Provincial Forest Division.

This means careful cutting of mature trees, the maintenance of seed sources in harvested areas, control of fire, ceaseless war against insects and disease and the planting of nursery-grown seedlings on burned-over areas.



## Forest Products

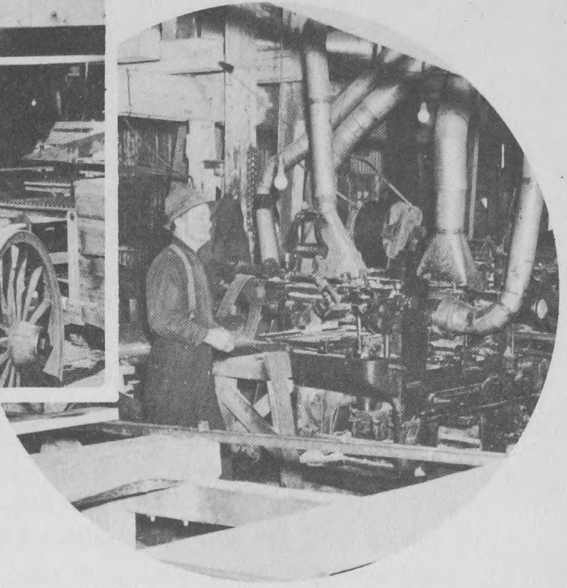
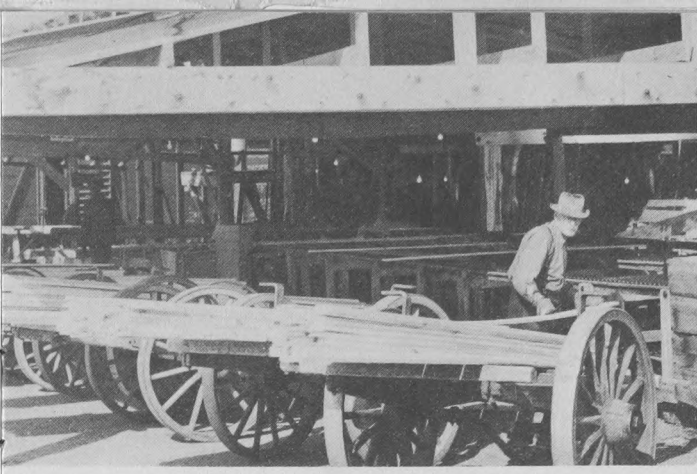


WOOD is amongst the most commonly used materials in daily life. We step out of bed — very likely a wooden one — on to a wooden floor and proceed to take breakfast at a wooden table, the while we read the morning paper which is a product of wood, as also is the ticket with which we pay our bus fare. At the office we sit on a wooden chair behind a wooden desk placed on a wooden floor. Wood constitutes a large part of our homes, both in the building and its furnishings. The wife's nylon stockings once grew in the forest so, very likely, did some of her dresses and beyond peradventure some part at least — maybe all — of her "silk" evening gown. Her husband's shirts, too, may be creatures of the woodland. The packets our cigarettes come in are wood products; so is the cellophane wrapping around them. So is the linoleum on the kitchen floor. So is the safety glass windshield. Turpentine, plastic, French ivory, photographic film . . . all derived, by the magic of modern alchemy, from wood.

In 1948 Alberta forests produced 390,997,404 feet board measure having a value of \$17,594,883 and employing some eight thousand persons on an \$8 million annual payroll. Not including some 300 portables there are about 1,400 sawmills in the province.

A brisk commerce was carried on for several years in fire-killed timber exported to the pulp and paper mills of Wisconsin and Michigan. This business was initiated in the middle 'forties by Mr. E. C. Dawley, then living at Prince Albert, Saskatchewan, and now of Wasau, Wisconsin. Though fourth among the Canadian provinces in pulpwood material, Alberta had then no pulpwood industry of its own.





Alberta planing mills.

Every year fire took, as it still does, immense toll of these resources, and Mr. Dawley's idea was that much of this fire-killed timber could be used if a market could be found.

The scheme caught the imagination of the American pulp manufacturers who were faced with a shortage of material. The Alberta Government was interested from the standpoint of the public economy, for here were possibilities of salvaging timber that otherwise would be wasted as well as of providing employment at a time when the armed forces were discharging time-expired men in thousands.

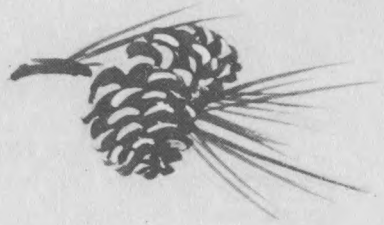
Furthermore, removal of dead timber and the consequent scarification of the forest floor would pave the way for natural regeneration.

A comparatively modest commencement was made in the Slave Lake district and in the first year 1,648 cords were exported. But the idea spread to all parts of the province wherever fire-killed timber could be located and where transportation costs were not prohibitive. The following year the business ran to 29,035 and in 1948 to 182,430 cords. But mounting freight rates, improved sources of supply closer to the American mills and a variety of technical considerations caused the business to shrink, and in 1948 Eastern interests commenced overtures looking toward the establishment of the first pulp and paper mill in Alberta.

But three years of experimentation with fire-killed timber were not in vain. During that time a dozen or more American mills

were virtually laboratories for experiment and with satisfactory results. There was less guesswork or none left for the entrepreneurs in an Alberta pulp and paper industry.

The Dominion Bureau of Statistics has estimated the volume of Alberta pulpwood material at 7,724,000,000 cubic feet. With the exception of Quebec, Ontario and British Columbia, Alberta is richest in forest resources, almost 70 percent of which are of the coniferous varieties used in the manufacture of pulp and paper. In addition, Alberta has water power and, in close proximity to the forests, unlimited coal and natural gas supplies.

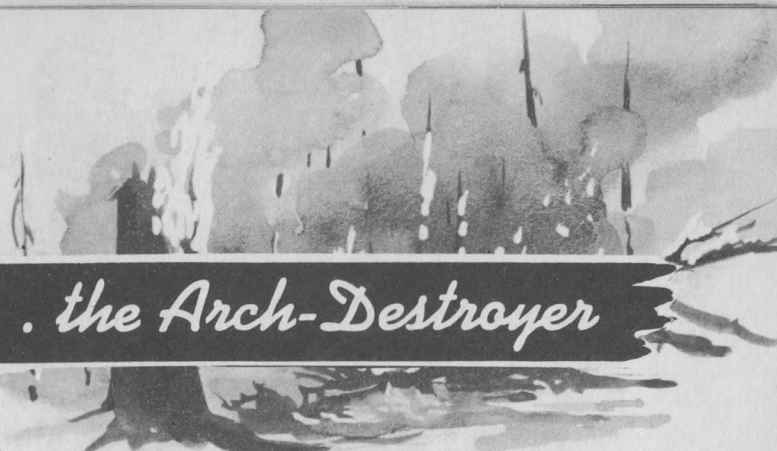


**An Edmonton factory where Alberta timber is made into fine furniture.**





## *Fire . . . the Arch-Destroyer*



**I**F there is anything more terrifying than forest fire it would be difficult to say what it is. Not earthquake . . . not battle . . . not flood or tidal wave. The fury of all these has to be felt to be believed. So has the fury of the forest fire. Its heat is terrible and it travels with unbelievable speed. Green trees far from the scene burst into flames as if they were made of paper, starting new fires. More fires are started miles from the scene by sparks and masses of burning bark carried abroad by the wind. The very air itself seems to be ablaze as gas released from the overheated wood bursts into flame.

Yet the beginnings of every such holocaust are usually simple. A cigarette end dropped thoughtlessly or tossed from a moving auto, a camp fire left before it was quite out, a match thrown carelessly aside while it is still blazing — these are a few of the most common forms of this destructive carelessness. Nor does the damage end there, for forests regulate the water supply on which the soil depends, provide a shelter for thousands of wild things and in a hundred ways contribute to the national and provincial economy.

Every year forest fires cost hundreds of thousands of dollars in direct loss and millions in indirect, and 90 per cent of it is due to carelessness.

The Alberta government maintains a well-trained forest fire-fighting organization, but in the last analysis the responsibility is the citizen's. For on his doorstep are to be found nearly all the causes to which forest fires are ordinarily attributable.

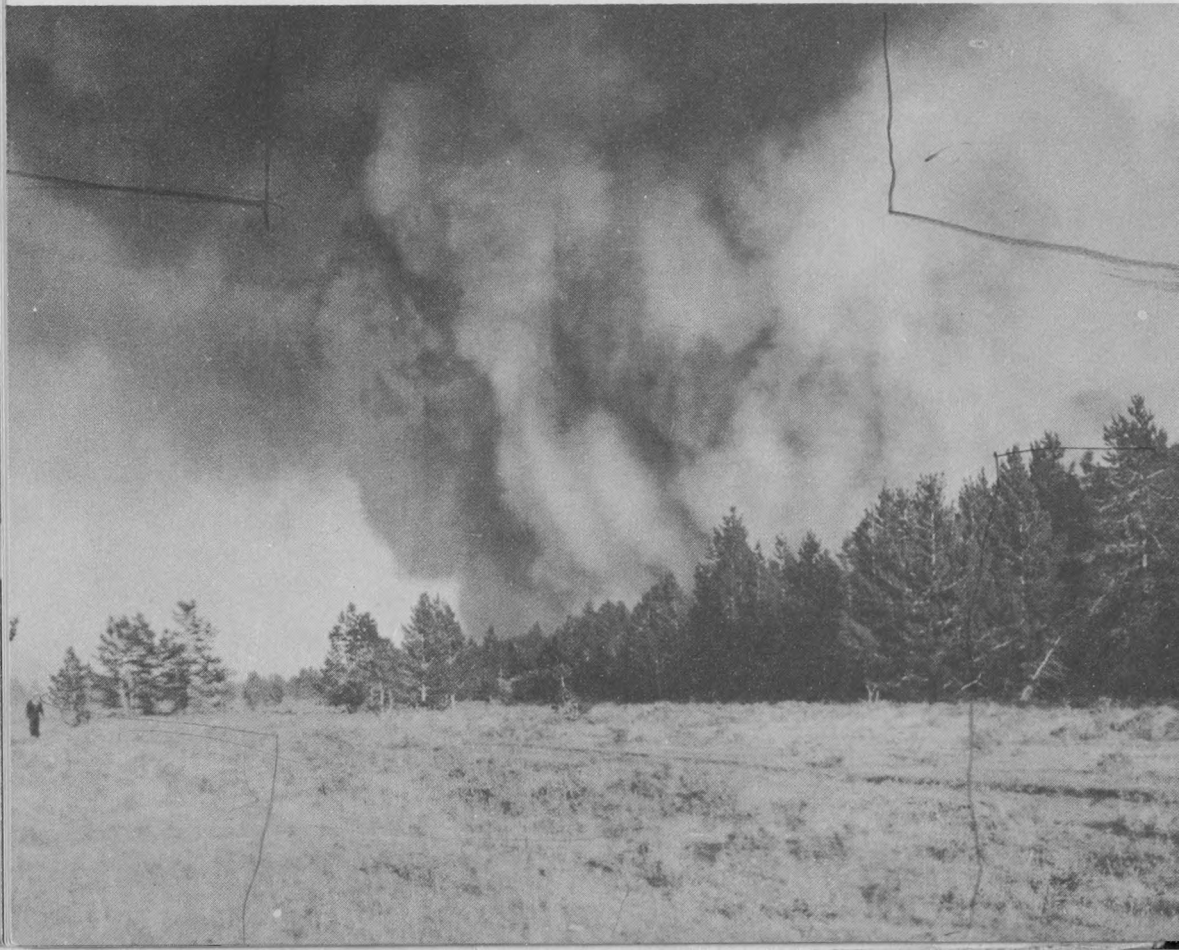
Slash fires which someone didn't trouble to put out are amongst the familiar causes. The smouldering fire which campers left behind . . . the cigarette butt . . . the glowing match . . . all these are familiar enough.



Accidental causes are harder to control; nevertheless they continue to diminish. On the other hand, in a single season campers, settlers and careless smokers have been known to account for 33 per cent of the loss. Besides these, in the same year, 24.6 per cent of the fires were of "unknown" origin, and it might be neither rash nor unjust to suppose that some portion of this can be added to that 33 per cent.

Although at the present time the Alberta Government maintains no air patrol of its own, excellent co-operation in fire spotting is obtained from commercial air lines and the Royal Canadian Air Force.

In the early detection and prevention of fire the radio is employed to good advantage, augmented at some towers by telephone hook-up with the radio network. Headquarters of forests and divisions of the Northern Alberta Forest District are covered



in this way by a network of telephone lines and radio and linked by means of radio-equipped patrol cars to lookout towers, ranger stations and supervising officers. The network is under direction of the radio communications branch which is connected by telephone to head office. By this means fires can be reported early and suppression crews with equipment and supplies moved rapidly to the scene of the outbreak.

The fight against a forest fire is handled in accordance with certain principles which experience has taught. Like any other battle it involves initiative, courage, imagination, quick thinking, resourcefulness and skilful tactical employment of suppression crews under the direction of the forest ranger who stands in the position of commander-in-chief.

The strength of the force employed will vary, of course, with the dimensions of the outbreak. A small blaze might be attached by a suppression crew composed of a foreman, a timekeeper





A forest patrol, watchful for signs of the dreaded fire, in touch with his headquarters by portable radiotelephone.

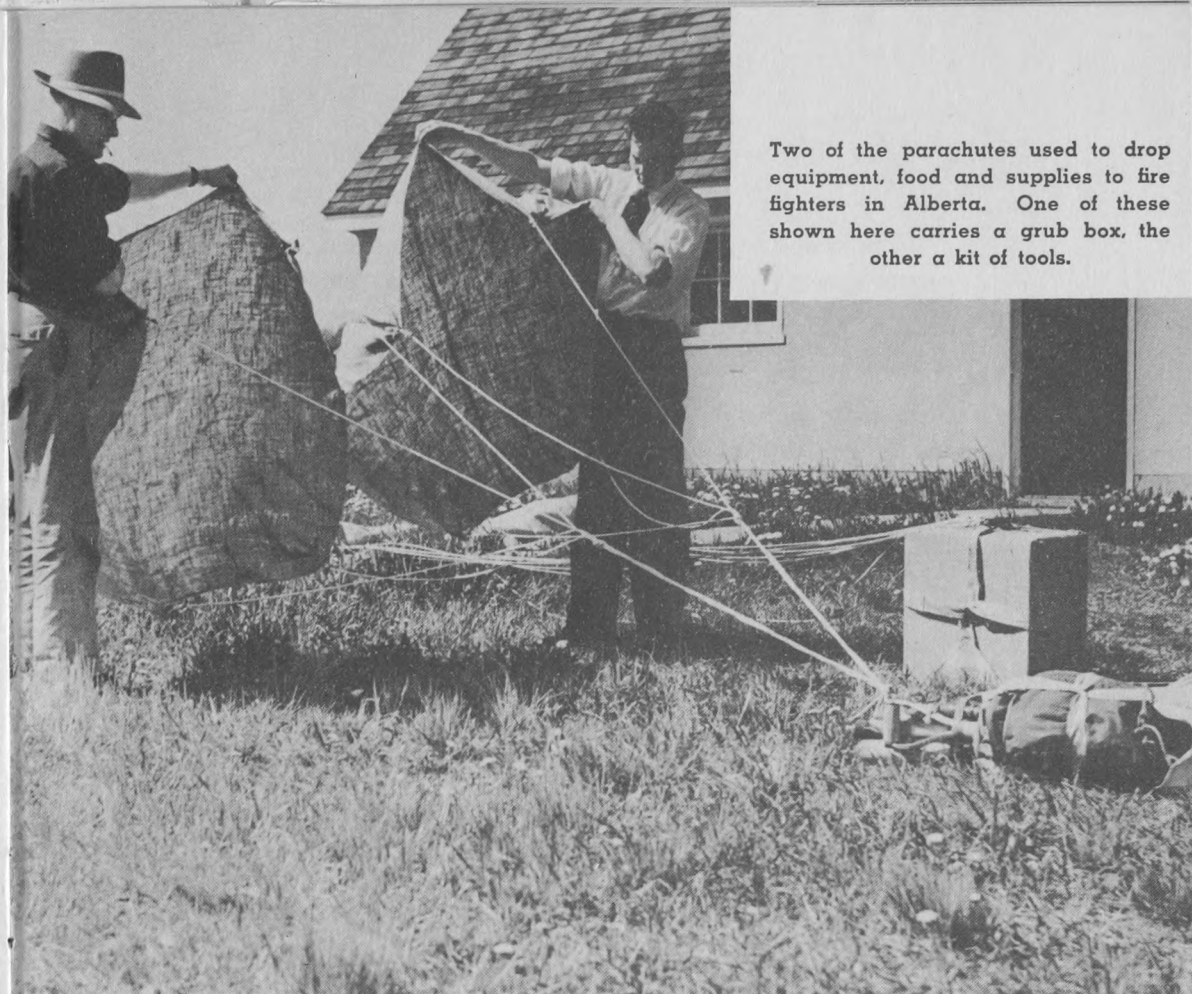
and ten men; a larger by several such suppression crews, each with its own foreman and a general foreman over all. As the fire grows the fire-fighting organization is built up with new suppression crews sent to the scene.

The fury of the fire may go unabated for days or weeks, but the men must sleep and be fed. Things may take an unexpected turn for the worse or a new fire break out. Hence for every crew engaged in actual fire fighting there is in support the indispensable train of cooks, packers, transport drivers, flunkies and general roustabouts.

Keeping such a force in the forest naturally creates a supply problem which air transport has greatly simplified. Fire cannot be depended upon to break out only near the access trails, or to stay within convenient reach of the latter. When wheeled transport was the only means of taking rations and supplies in to the suppression crews it often involved hewing out a path — a construction job, however rough and ready, which might take days. Dropping of food and tools by parachute has been experimented with and found to be successful. Further details will have to be worked out before this method can be adopted as a general rule in remote areas.

Except in the national parks, which are Dominion Government territory, responsibility of forest protection from fire has been a care of the Alberta Government since 1930 when the latter took over natural resources. The gravity of this responsibility will be appreciated when it is realized that it includes the eastern slope of the Rockies which is the watershed upon which the whole of Western Canada depends.





Two of the parachutes used to drop equipment, food and supplies to fire fighters in Alberta. One of these shown here carries a grub box, the other a kit of tools.

This means, amongst other things, that the whole agricultural area of these Prairie provinces relies upon the forests of this eastern slope for the moisture upon which the soil in turn depends. It means control over the level of lakes where commercial fishing is carried on and of rivers — tiny rivulets where cattle drink, mighty streams like the Athabasca where vessels ply their trade with the north; control over tumbling cascades where power is generated for harnessing to millions of dollars worth of industries to say nothing of the lighting of our homes, our offices, our churches or the operation of the little woman's varied household appliances. It means shelter for the horned, the antlered and the feathered things, the mole, the field mouse and fur-bearing creatures from the marmot to the grizzly. It means all this and much more on which the very life of the nation depends.

Here are a few forest fire statistics for an average year:

Number of fires 349. Area, 684,823 acres, forested area 408,323 acres, non-forested 276,500 acres. Loss \$1,084,651. Cost of suppression \$99,588.00.

In 1949, 21.4 per cent of the forest fires were caused by campers, 9.6 per cent by smokers, 23.6 per cent by settlers and 7.3 per cent were traced to incendiary origin. In other words, whether by carelessness or malice, 61.9 per cent were started through human agency without including any portion of those fires, representing 17.3 per cent, listed as "unclassified" or "unknown".





## Plague and Pestilence

**L**ESS spectacular than fire but not less destructive—frequently more so — are the insect pests that prey upon the forests. An outbreak of fire is easily spotted and quickly recognized even by the untrained eye, and all available manpower enlisted for its suppression. War against the insect pest or disease is not so simple for only the trained eye of the entomologist or pathologist can detect the damage in its early stages. If these specialists are on the spot they can very readily ferret out any ravages of insects.

In this branch of the work of forest conservation the Forest Division has the benefit of co-operation by the Dominion Government's department of Agriculture through the Dominion Laboratory of Forest Pathology at the University of Saskatchewan, Saskatoon, and the Dominion Laboratory of Forest Biology which has its administrative headquarters at Calgary and field laboratory at Seebe, Alberta.

From these headquarters the Dominion's forest insect protective organization for the Rocky Mountain Region commenced operations in 1948. Its territory includes the eastern slope of the Rockies, all of the national parks of the Rocky Mountains and in addition the Glacier and Revelstoke national parks.

The most formidable enemy with which the service has to contend at present is the lodgepole pine needle miner which threatens all of the pine stands in the Rocky Mountain national parks. This insect is most difficult to control and in the absence of natural control factors resort to applied control appears to be the only solution. This in 1948 involved, since successful control had first to be demonstrated, spraying from the air on experimental 20-acre



areas. This was done by helicopter chartered from a commercial air line. Another approach to the solution of the problem is through biological control by the introduction of parasites from other regions. Some liberations of parasites have already been made, supplied by the Dominion Parasite Laboratory at Belleville, Ontario.

Throughout the Bow Valley from Banff to Lake Louise the needle miner situation has improved tremendously because of a mortality of the larvae in the severe winter of 1949-50.

The insect ranger service is now well organized with a particular district assigned to each ranger. Comprehensive surveys are made annually in all forest reserves, in the Northern Alberta Forest District, and in all of the national parks. The service is being expanded in 1951 to include some portions of the Northwest Territory.

The area most seriously injured by the lodge pole needle miner was found to be from four miles east of Banff, westward nearly to Field, southward into Kootenay Park and fourteen miles northward up the Banff-Jasper Highway from Lake Louise. Many

Often more devastating than fire is the havoc that can be wrought by insect pests.



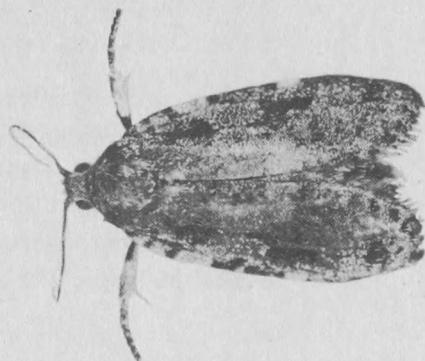
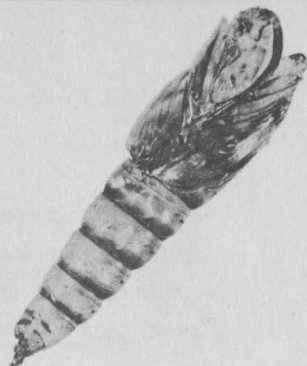
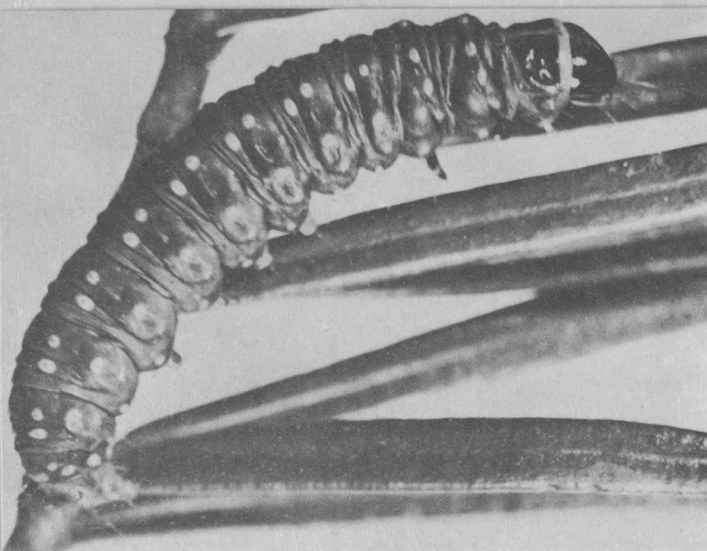
trees in mature stands near Lake Louise have been so severely injured that there seems to be little hope for their recovery, but around Banff and Hillsdale the outbreak did not appear to have been active long enough to show much injury.

Unrelated to this were several outbreaks in Jasper National Park which undoubtedly arose independently from an indigenous low population. A light infestation was found also up the Racehorse Creek trail near Maycroft.

Less serious, but potentially dangerous, is the spruce budworm which has been identified around Hillsdale, Johnston's Canyon, Mount Eisenhower, Moraine Lake, Lake Louise, in the Marble Canyon district in Kootenay Park, along the Cascade River, at Lake Minnewanka and near the eastern entrance to the Banff Park. In Jasper Park a few empty pupal cases were found along

Here is an example of heavy mortality due to the feeding of the spruce budworm.





### THE SPRUCE BUDWORM

Above—larva.

Top right—pupa.

Lower right—adult.

the Portal Creek and several collections were brought in from Crowsnest south of Blairmore. Several samples of pine budworm were also taken in this territory. It has been determined by entomologists that the present infestation of the larch sawfly is confined to a relatively small area in the vicinity of Cold Lake.

The American poplar beetle was found operating around Waterton Lakes, and near Coleman some 40 per cent of the young spruce has been damaged from the spruce weevil. Severe weevil damage to spruce has also been found in Kootenay National Park.

Other species present which have not yet caused appreciable damage, but which might easily do so, are the yellow-headed spruce sawfly, pine needle scale, and tent caterpillars in various parts of Alberta.

The insect prevention service is as yet only making a beginning in Alberta, but should, when fully developed, go far to provide the prevention which is proverbially worth many times its weight in cure.





## Conservation and Reforestation



THE principles of forestry are similar to those of good farming or gardening.

Importance of the science is frequently not realized because the farmer is accustomed to harvesting his crop or the gardener to gathering his fruits or his flowers every year. The idea of a crop that takes twenty-five to a hundred years to grow too often fails to impinge on the imagination.

Actually, however, this is not the case. A scientifically grown forest contains trees of all ages; young trees just beginning life as well as older trees which would die of disease or age if left uncut. Hence the process of "selective cutting" whereby the older trees of 14 inches diameter or more are removed, as we all are, to serve humanity in another sphere and replaced by a generation demanding room to grow.

If the trees in any given forest are all of the same age the whole stand may have to be cut when mature, converted to other uses and young trees planted in their place. If the trees are all young or of mixed ages resort is had to thinning just as a gardener thins out his plants.

But the analogy of the forest and the farm field fails in some respects. Whereas the latter must be systematically seeded from year to year, not all trees are hand planted; some broadcast their wind-blown seeds over the cleared land in the process of "natural regeneration". Another way in which the forest takes care of itself is by the dropping of leaves and twigs which, when decomposed, serve as fertilizer.

But bringing the forest up from infancy to adolescence and age is not the forester's only care. All through its life he must be ever watchful to protect it from its enemies; against insects, against disease, against fire, most of which is man-made either by accident, by carelessness, by ignorance or human greed and sometimes by wilful destruction.

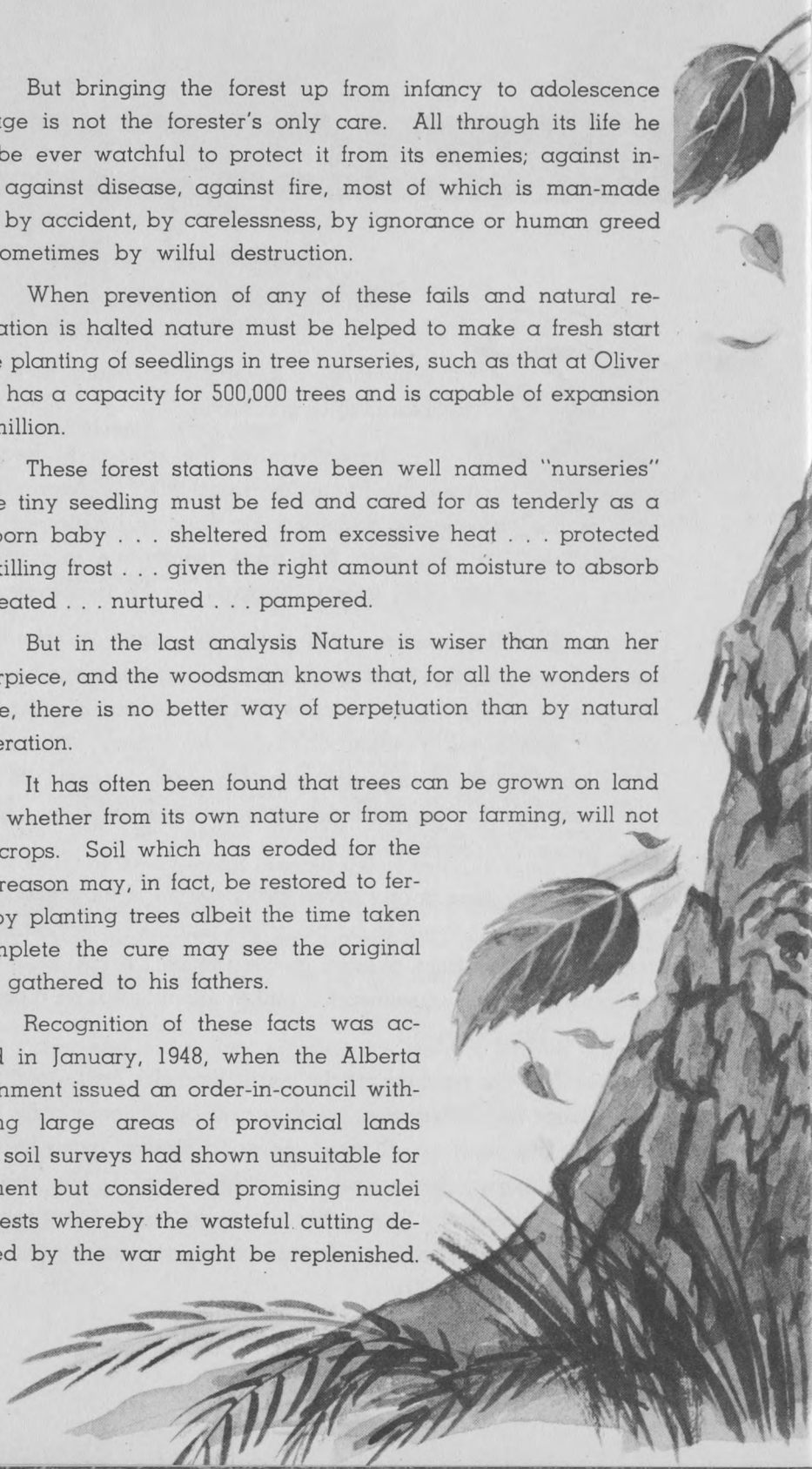
When prevention of any of these fails and natural regeneration is halted nature must be helped to make a fresh start by the planting of seedlings in tree nurseries, such as that at Oliver which has a capacity for 500,000 trees and is capable of expansion to a million.

These forest stations have been well named "nurseries" for the tiny seedling must be fed and cared for as tenderly as a new born baby . . . sheltered from excessive heat . . . protected from killing frost . . . given the right amount of moisture to absorb . . . treated . . . nurtured . . . pampered.

But in the last analysis Nature is wiser than man her masterpiece, and the woodsman knows that, for all the wonders of science, there is no better way of perpetuation than by natural regeneration.

It has often been found that trees can be grown on land which whether from its own nature or from poor farming, will not grow crops. Soil which has eroded for the latter reason may, in fact, be restored to fertility by planting trees albeit the time taken to complete the cure may see the original settler gathered to his fathers.

Recognition of these facts was accorded in January, 1948, when the Alberta Government issued an order-in-council withdrawing large areas of provincial lands which soil surveys had shown unsuitable for settlement but considered promising nuclei for forests whereby the wasteful cutting demanded by the war might be replenished.





The area so withdrawn is considerable, but the same order-in-council provides for making the lands withdrawn again available for settlement if suitable for farming and as conditions warrant.

The standard homestead lease entered into between the government and settlers contains a clause which requires the settler to retain 20 per cent of the timber until he has earned title to the land. By then, it is supposed, he will have sufficiently learned to appreciate the timber as protection for his cattle, as fuel, as windbreak, as material for his fence posts and a means of accumulating snow during the winter months. Even after he has patent to the land and is no longer bound by homestead lease he will, if he is wise, still retain some percentage of timber.

In 1901, the Dominion Government, recognizing the importance of trees, first began free distribution of seedlings, cuttings and tree seed to farmers on the prairies. Augmenting the Dominion policy, the Alberta Government distributes between 60,000 and 150,000 trees a year.

UPON OUR  
*Forests*  
DEPEND OUR

ANNUAL  
RUN OFF  
•  
WILD LIFE  
•  
GAME BIRDS  
•  
SOIL  
FERTILITY  
•  
LUMBER  
INDUSTRY  
•  
PAPER  
INDUSTRY  
•  
WOOD  
CHEMISTRY

*Protect our  
Trees*

FROM FIRE  
AND  
PLAGUE

THEY SERVE  
YOU  
EVERY DAY



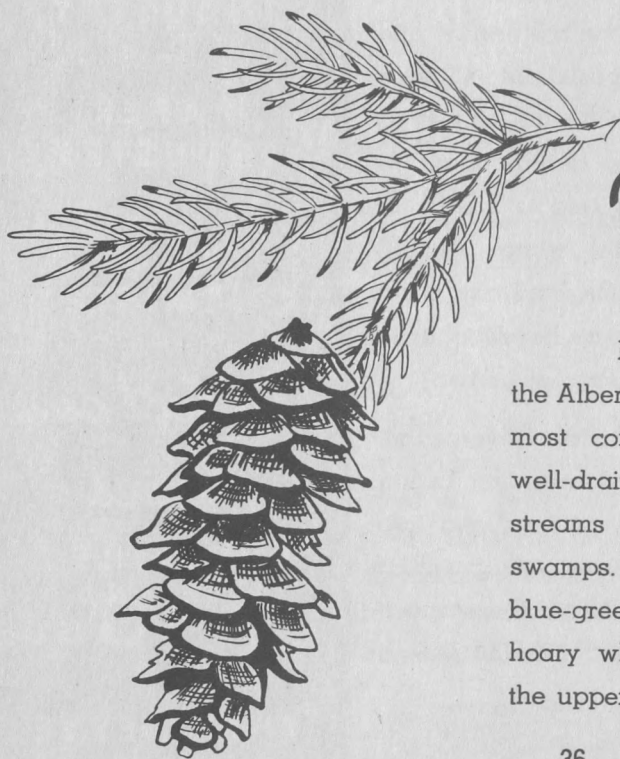


# Meet the Alberta Trees



**W**E like people more and feel we understand them better when we know their names. If this is true about our human relationships perhaps we shall find it equally true about our friends the trees. In any event it will add greatly to the enjoyment of our next stroll through the woods if we are able to recognize them and call them by their names. So let's go.

The first group to be dealt with are the coniferous (or cone-bearing) trees which are evergreen with the exception of the tamarack (larch) which sheds its leaves in the autumn.



## White Spruce

By far the most important of the Alberta species is the white spruce, most commonly found growing on well-drained, moist, gravelly soil along streams and around the borders of swamps. Its leaves are sharp-pointed, blue-green and not shiny. They are hoary when young and twist up to the upper side of the twig. The cones



are narrow in proportion to their length with edges of the scales smooth and the scales themselves flexible. The tree itself is tall and full-crowned with branches turning upward at the end.

Its wood is characterized by a clean, smooth texture combined with strength and lightness which finds favour in construction of every kind, in interior finishes, floors, boxes, boats and many other uses.

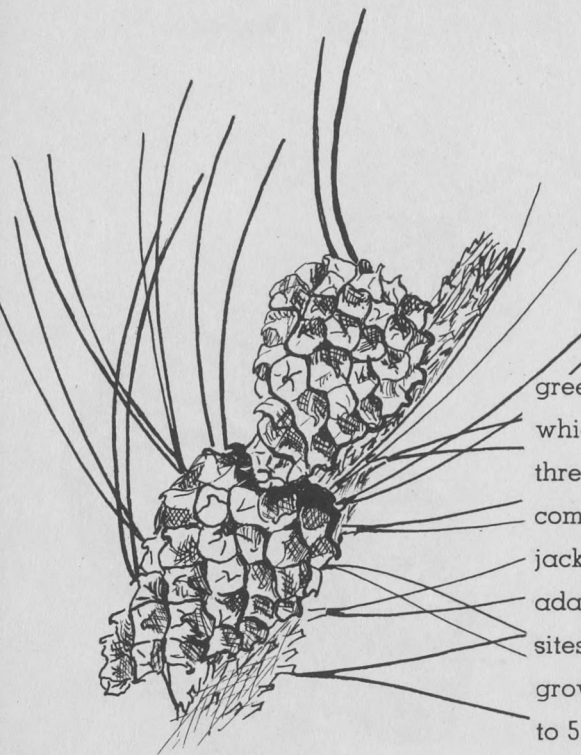
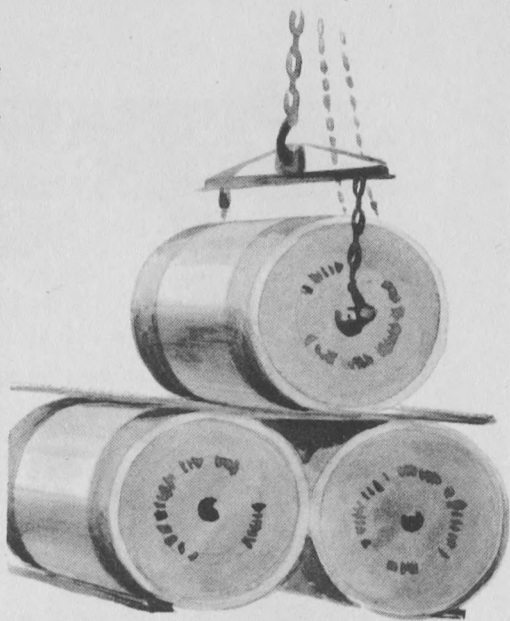
## Black Spruce

Less important, but equally common is the black spruce, most valuable tree for the manufacture of pulpwood for newsprint. Its leaves are blunter pointed than the white spruce, blue-green in color, dull, and spread out in all directions. It has an almost round cone when the scales are open and the scales are very stiff and



hard with roughly notched edges. The crown is rather sparse with short, drooping branches.

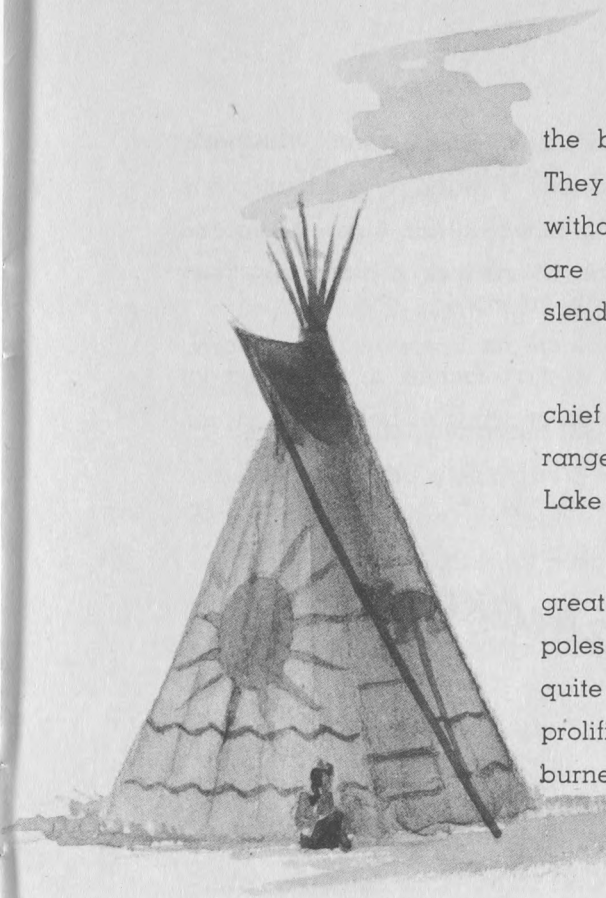
This is a slow-growing tree found amongst rocks and swamps where other species cannot exist. It is a most important variety, commercially the most valuable of the species for pulp not only for Alberta but all Canada since in the export of newsprint Canada has led the world since 1913.



## The Pines

All Alberta pines are ever-green and bear long, needlelike leaves which always occur in groups of two, three or five. The two species most commonly found in Alberta are the jackpine and lodgepole pine. Both are adapted to a wide range of growing sites although the lodgepole pine grows usually at altitudes from 2,000 to 5,000 feet. Jackpine cones are short, pear-shaped and curved in towards





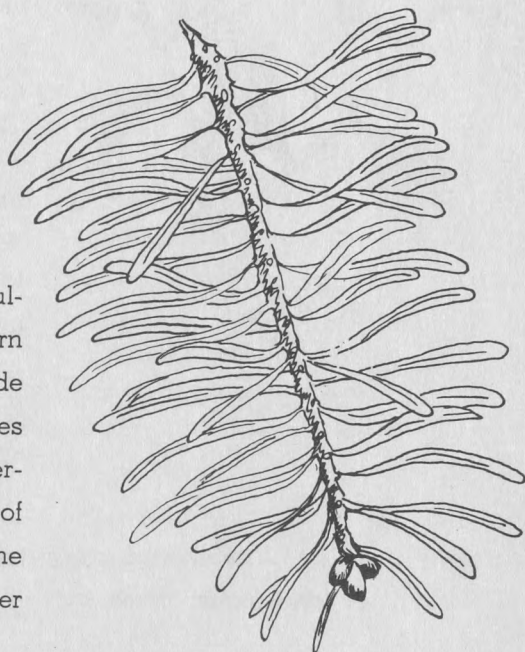
the branch, often occurring in pairs. They may cling to the tree many years without opening. The lodgepole cones are very similar but usually have slender prickles on the cone scales.

The lodgepole pine is the chief tree at Banff and Jasper and its range extends to the Lesser Slave Lake area where it meets the jackpine.

The wood of the pines is in great demand for ties, mine timbers, poles and lumber. The tree grows quite rapidly and reproduces its kind prolifically, particularly in sandy, burned-over land.

## Balsam Fir

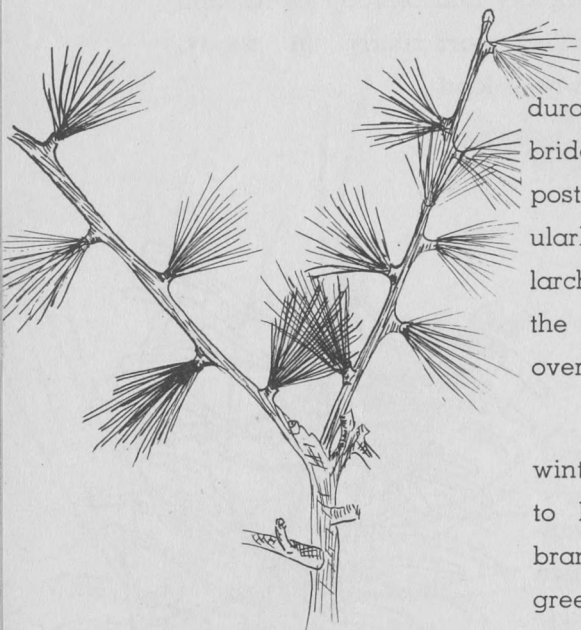
This is one of the trees peculiarly characteristic of cold, northern climate requiring moisture and shade to reach its maximum size. Its leaves are flat, very blunt and whitish underneath, and are arranged on most of the twigs in two ranks so that the whole twig and leaves have an upper



and lower side, green on one and whitish on the other. The bark, especially on young trees, is usually covered with conspicuous blisters full of a clear, sticky liquid called balsam gum. The cones are two to four inches long and about one inch in diameter. They are purplish in color and stand erect at all times.

Its principal use is in the manufacture of pulpwood for newsprint production and in the construction of boxes and crates.

## Tamarack (Larch)



This is the source of a very durable, hard wood used chiefly as bridge timber and floorings, fence posts and poles. It is, however, particularly susceptible to attack by the larch sawfly whose depredations upon the species may be most devastating over a period of years.

It is easily recognizable in winter because it is the only conifer to lose its leaves. In summer, its branches are covered with bright green needles, borne in bundles of twelve to forty. The cones are very small, about one-half inch in length with about twenty brown scales.

The second group to be dealt with are the broad-leaved (or deciduous) trees.

# Poplars

The poplars are medium to large, fast growing, moisture-loving trees.

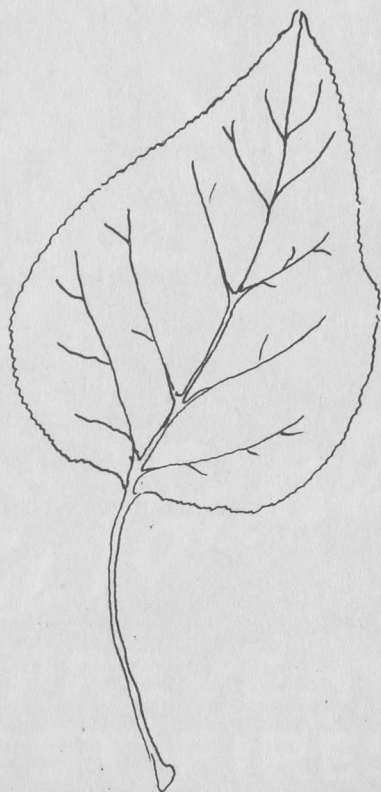
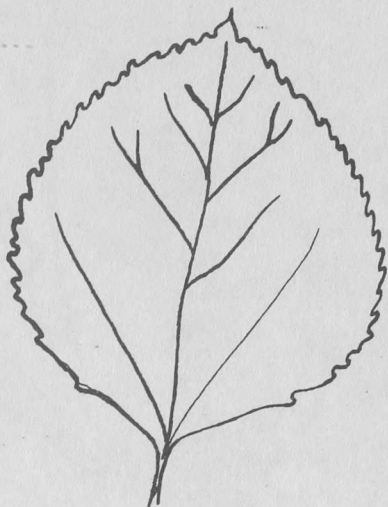
The trembling aspen (or white poplar) covers the most extensive area of any tree in North America. It is found on a wide variety of soils, particularly on burned-over areas. It often acts as a nurse crop for spruce or pine.

Its leaves are nearly circular, abruptly pointed, fine toothed with rounded teeth and are borne on long, slightly flattened stalks. This flattening causes the leaf to tremble in the slightest breeze.

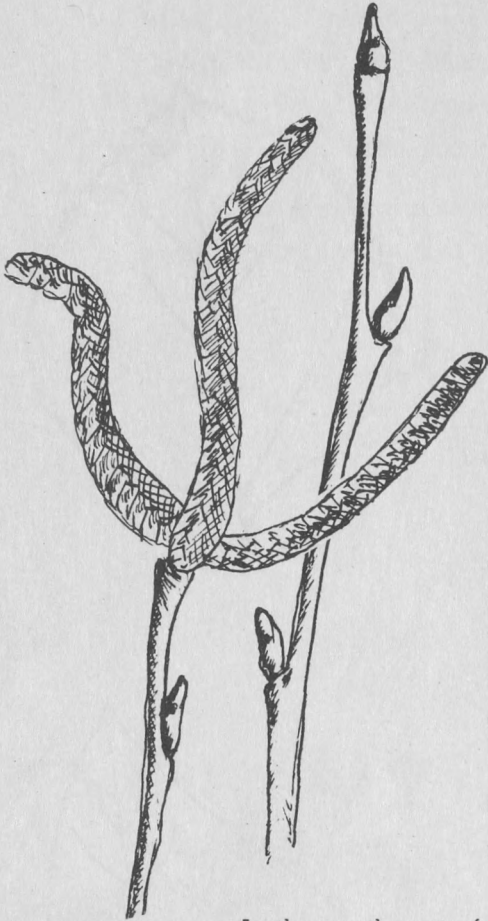
The balsam poplar (black poplar) also covers a very extensive area of North America being most commonly found on rich, moist soils such as on the banks of streams and bottom lands.

Its leaves are oval or heart-shaped, larger than those of the white poplar, dark green on top and lighter below. The leaf stems are round.

The wood of both poplars is used for veneer, matches, furniture, excelsior, lumber, fuelwood and pulp.







## White Birch

This species is found in nearly every part of Canada. It is a medium-sized tree with the well-known paper-like bark which can be removed and split into thin sheets. This bark provided the material for the birchbark canoe, coverings for wigwams and other utilities famous in the romance of the frontier. Its wood is valuable for high quality plywood, furniture, flooring and fuelwood.

In the southwest of Alberta there is to be found the Douglas fir, a conifer famous for its strength and durability in building construction. It is, however, confined to a very small area and is relatively unimportant in the commerce of the province.

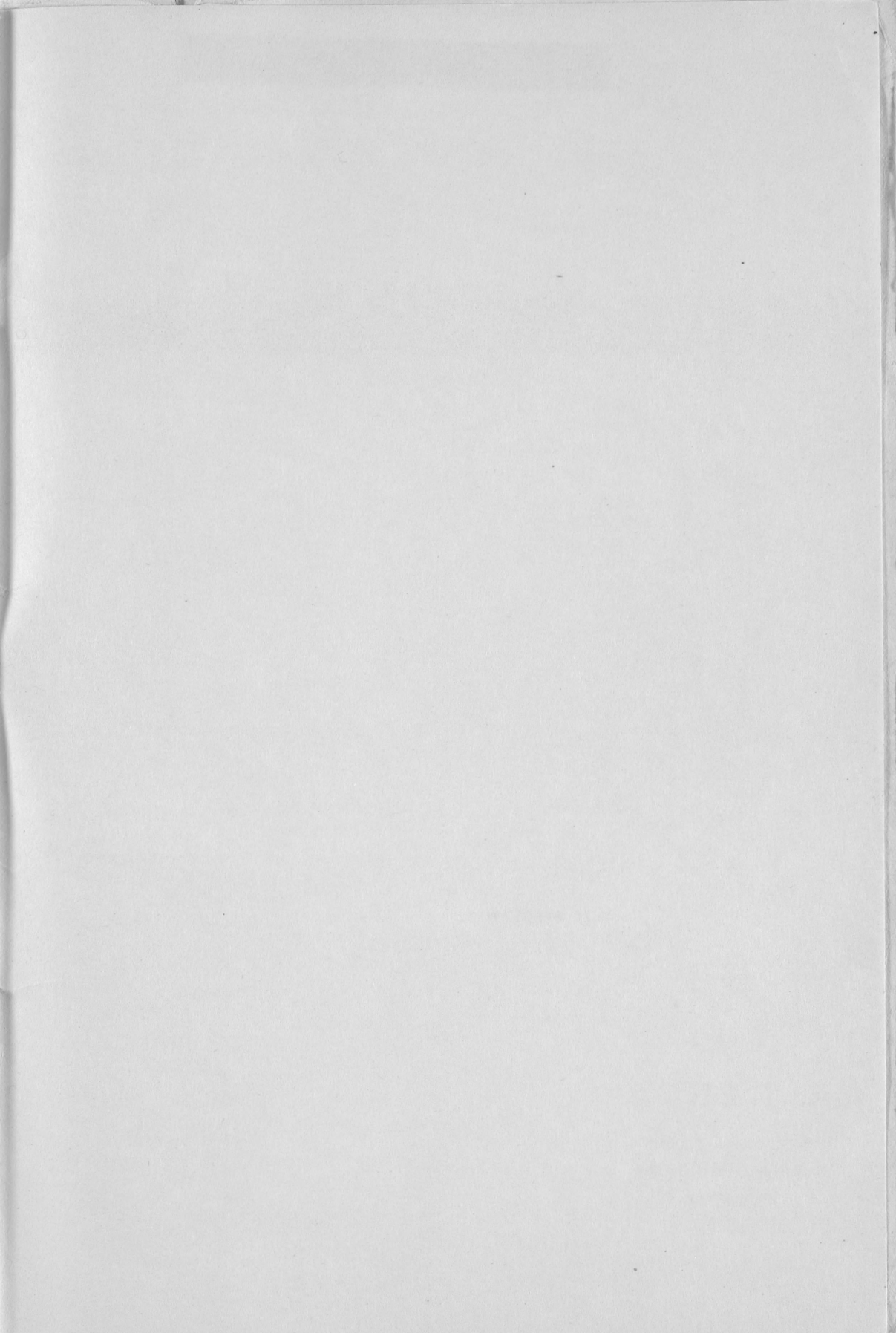
There are several other pines, larches, spruces, firs, junipers, poplars, birches, alders, cherries, and other miscellaneous genera native to Alberta but they, too, are of little commercial value.



*Protect Alberta Forests*  
**PREVENT  
FOREST FIRES**







# DATE DUE SLIP

DUE CAM NOV 27 '85	DUE CAM MAR 24 '94
NOV 22 RETURN	APR 05 1994
DUE CAM APR 24 '86	APR 04 RETURN
APR 12 RETURN	DEC 05 1994
MAR 08 '89	NOV 22 RETURN
MAR 08 RETURN	
Due Cam MAR 27 1990	
MAR 26 RETURN	
Due Cam DEC 16 1991	
DEC 05 RETURN	
Due Cam OCT 22 1992	
SEP 15 RETURN	
Due Cam OCT 14 1992	
OCT 09 RETURN	
DUE CAM DEC 31 '93	
JAN 05 RETURN	
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